



Labor Market Analysis for Program Recommendation Software Development Occupations Merritt College

Prepared by the San Francisco Bay Center of Excellence for Labor Market Research
May 2022

Recommendation

Based on all available data, there appears to be an “undersupply” of Software Development workers compared to the demand for this cluster of occupations in the Bay region and in the East Bay sub-region (Alameda, Contra Costa counties). There is a projected annual gap of about 20,369 students in the Bay region and 2,338 students in the East Bay Sub-Region.

Introduction

This report provides student outcomes data on employment and earnings for TOP 0707.00 Computer Software Development programs in the state and region. It is recommended that these data be reviewed to better understand how outcomes for students taking courses on this TOP code compare to potentially similar programs at colleges in the state and region, as well as to outcomes across all CTE programs at Merritt College and in the region.

This report profiles Software Development Occupations in the 12 county Bay region and in the East Bay sub-region for a proposed new Concurrent Software Development for Cloud, Cluster, GPU, and Multi-Core CPU program at Merritt College. This report can also be used for Merritt’s proposed new Open Source Software Development program because the TOP code and four SOC codes are exactly the same for both programs.

- **Computer Systems Analysts (15-1211):** Analyze science, engineering, business, and other data processing problems to implement and improve computer systems. Analyze user requirements, procedures, and problems to automate or improve existing systems and review computer system capabilities, workflow, and scheduling limitations. May analyze or recommend commercially available software.
Entry-Level Educational Requirement: Bachelor’s degree
Training Requirement: None
Percentage of Community College Award Holders or Some Postsecondary Coursework: 21%
- **Information Security Analysts (15-1212):** Plan, implement, upgrade, or monitor security measures for the protection of computer networks and information. May ensure appropriate security controls are in place that will safeguard digital files and vital electronic infrastructure. May respond to computer security breaches and viruses. Excludes “Computer Network Architects” (15-1143).
Entry-Level Educational Requirement: Bachelor’s degree
Training Requirement: None
Percentage of Community College Award Holders or Some Postsecondary Coursework: 27%
- **Computer Programmers (15-1251):** Create, modify, and test the code, forms, and script that allow computer applications to run. Work from specifications drawn up by software developers or other individuals. May assist software developers by analyzing user needs and designing software solutions. May develop and write computer programs to store, locate, and retrieve specific documents, data, and information.

Entry-Level Educational Requirement: Bachelor's degree

Training Requirement: None

Percentage of Community College Award Holders or Some Postsecondary Coursework: 20%

- **Software Developers and Software Quality Assurance Analysts and Testers (15-1256):** Develop, create, and modify general computer applications software or specialized utility programs. Analyze user needs and develop software solutions. Design software or customize software for client use with the aim of optimizing operational efficiency. May analyze and design databases within an application area, working individually or coordinating database development as part of a team. May supervise computer programmers.

Entry-Level Educational Requirement: Bachelor's degree

Training Requirement: None

Percentage of Community College Award Holders or Some Postsecondary Coursework: 11%

Occupational Demand

Table 1. Employment Outlook for Software Development Occupations in Bay Region

Occupation	2020 Jobs	2025 Jobs	5-yr Change	5-yr % Change	5-yr Total Openings	Annual Openings	25% Hourly Earning	Median Hourly Wage
Computer Systems Analysts	28,228	31,066	2,837	10%	13,093	2,619	\$45	\$60
Information Security Analysts	4,590	5,866	1,276	28%	3,114	623	\$50	\$65
Computer Programmers	10,203	10,519	316	3%	3,982	796	\$43	\$56
Software Developers and Software Quality Assurance Analysts and Testers	139,981	167,183	27,201	19%	82,215	16,443	\$56	\$72
Total	183,002	214,634	31,632	17%	102,404	20,481		

Source: EMSI 2021.4

Bay Region includes: Alameda, Contra Costa, Marin, Monterey, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano and Sonoma Counties

Table 2. Employment Outlook for Software Development Occupations in East Bay Sub-region

Occupation	2020 Jobs	2025 Jobs	5-yr Change	5-yr % Change	5-yr Total Openings	Annual Openings	25% Hourly Earning	Median Hourly Wage
Computer Systems Analysts	5,243	5,338	94	2%	1,927	385	\$41	\$53
Information Security Analysts	817	963	145	18%	460	92	\$43	\$56
Computer Programmers	1,822	1,718	-104	-6%	589	118	\$41	\$52
Software Developers and Software Quality Assurance Analysts and Testers	18,059	19,959	1,900	11%	8,718	1,744	\$49	\$62
Total	25,941	27,978	2,037	8%	11,694	2,339		

Source: EMSI 2021.4

East Bay Sub-Region includes: Alameda, Contra Costa Counties

Job Postings in Bay Region and East Bay Sub-Region

Table 3. Number of Job Postings by Occupation for latest 12 months (May 2021 - Apr 2022)

Occupation	Bay Region	East Bay
Software Developers, Applications	96,634	14,244
Computer Systems Analysts	12,594	2,409
Information Security Analysts	8,051	1,511
Computer Programmers	4,137	952
Software Developers, Systems Software	830	198
Informatics Nurse Specialists	22	4

Source: Burning Glass

**Table 4a. Top Job Titles for Software Development Occupations for latest 12 months (May 2021 - Apr 2022)
Bay Region**

Title	Bay	Title	Bay
Software Engineer	3,048	Full Stack Developer	577
Senior Software Engineer	2,734	Salesforce Developer	525
Devops Engineer	1,383	Python Developer	507
Java Developer	979	Senior Java Developer	428
Senior Devops Engineer	754	Principal Software Engineer	421
Business Systems Analyst	692	Staff Software Engineer	410
Android Developer	689	Full Stack Engineer	337
Software Developer	668	Full-Stack Software Engineer	321
ios Developer	602	Software Engineer III	316

Source: Burning Glass

**Table 4b. Top Job Titles for Software Development Occupations for latest 12 months (May 2021 - Apr 2022)
East Bay Sub-Region**

Title	East Bay	Title	East Bay
Software Engineer	513	Full-Stack Software Engineer	103
Senior Software Engineer	477	Android Developer	94
Devops Engineer	261	Senior Java Developer	93
Java Developer	206	Software Engineer - Remote	85
Business Systems Analyst	169	ios Developer	84
Software Developer	168	Salesforce Developer	83

Title	East Bay	Title	East Bay
Senior Devops Engineer	116	Entry Level Software Engineer	79
Full Stack Developer	112	Junior Software Developer	70
.Net Developer	103	Build/Release Engineer	69

Source: Burning Glass

Industry Concentration

Table 5. Industries hiring Software Development Workers in Bay Region

Industry - 6 Digit NAICS (No. American Industry Classification) Codes	Jobs in Industry (2020)	Jobs in Industry (2025)	% Change (2020-25)	% Occupation Group in Industry (2020)
Custom Computer Programming Services	40,233	47,060	17%	22%
Software Publishers	22,855	26,610	16%	12%
Computer Systems Design Services	22,801	24,945	9%	12%
Electronic Computer Manufacturing	15,689	17,679	13%	8%
Internet Publishing and Broadcasting and Web Search Portals	14,178	18,768	32%	8%
Data Processing, Hosting, and Related Services	7,680	9,546	24%	4%
Other Computer Related Services	5,368	5,921	10%	3%
Corporate, Subsidiary, and Regional Managing Offices	4,645	4,302	-7%	2%
Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology)	3,522	4,102	16%	2%
Semiconductor and Related Device Manufacturing	2,160	2,152	0%	1%

Source: EMSI 2021.4

Table 6. Top Employers Posting Software Development Occupations in Bay Region and East Bay Sub-Region (May 2021 - Apr 2022)

Employer	Bay	Employer	East Bay
Amazon	2,414	Lucid Motors Inc	739
Google Inc.	1,549	Workday, Inc	530
Apple Inc.	1,211	Wells Fargo	424
Lucid Motors Inc	1,082	Accenture	184
Wells Fargo	931	Lawrence Livermore National Laboratory	173
Accenture	930	Albertsons	167
Walmart / Sam's	916	Pacific Gas and Electric Company	163

Employer	Bay	Employer	East Bay
Nvidia Corporation	861	Blue Cross Blue Shield of California	145
Uber	792	TATA Consultancy Services	144
Facebook	753	Kaiser Permanente	139

Source: Burning Glass

Educational Supply

There are four (4) community colleges in the Bay Region issuing 112 awards on average annually (last 3 years ending 2018-19) on TOP 0707.00 Computer Software Development. In the East Bay Sub-Region, there is one (1) community college that issued one (1) award on average annually (last 3 years) on this TOP code.

Table 7. Community College Awards on TOP 0707.00 Computer Software Development in Bay Region

College	Subregion	Associate	Certificate Low	Total
Las Positas	East Bay	0	1	1
San Francisco	Mid-Peninsula	0	2	2
San Mateo	Mid-Peninsula	7	83	90
Solano	North Bay	0	19	19
Total		7	105	112

Source: Data Mart

Note: The annual average for awards is 2016-17 to 2018-19.

Gap Analysis

Based on the data included in this report, there is a large labor market gap in the Bay region with 20,481 annual openings for the Software Development occupational cluster and 112 annual (3-year average) awards for an annual undersupply of 20,369 students. In the East Bay Sub-Region, there is also a gap with 2,339 annual openings and one (1) annual (3-year average) award for an annual undersupply of 2,338 students.

Student Outcomes

Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0707.00 Computer Software Development

Metric Outcomes	Bay All CTE Program	Merritt All CTE Program	State 0707.00	Bay 0707.00	East Bay 0707.00	Merritt 0707.00
Students with a Job Closely Related to Their Field of Study	74%	72%	64%	63%	N/A	N/A
Median Annual Earnings for SWP Exiting Students	\$47,419	\$40,432	\$45,383	\$54,036	N/A	N/A
Median Change in Earnings for SWP Exiting Students	23%	10%	19%	20%	N/A	N/A
Exiting Students Who Attained the Living Wage	52%	52%	57%	61%	N/A	N/A

Metric Outcomes	Bay All CTE Program	Merritt All CTE Program	State 0707.00	Bay 0707.00	East Bay 0707.00	Merritt 0707.00
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Source: Launchboard Strong Workforce Program Median of 2017 to 2020.

Skills, Certifications and Education

Table 9. Top Skills for Software Development for Occupations in Bay Region (May 2021 - Apr 2022)

Skill	Posting	Skill	Posting
Software Engineering	50,625	Scrum	9,807
Java	41,000	Unit Testing	9,757
Software Development	36,190	Project Management	9,534
Python	34,759	Microsoft C#	9,334
SQL	24,643	Data Structures	9,232
JavaScript	22,824	NoSQL	9,154
C++	18,700	Agile Development	8,355
Linux	17,854	Oracle	8,344
DevOps	14,120	Web Application Development	8,273
Git	13,932	Machine Learning	8,093
Kubernetes	13,882	Quality Assurance and Control	7,992
Debugging	12,826	Scalability Design	7,811
Docker Software	10,784	Software Architecture	7,779
Object-Oriented Analysis and Design (OOAD)	10,374	Apache Kafka	7,582

Source: Burning Glass

Table 10. Certifications for Software Development Occupations in Bay Region (May 2021 - Apr 2022)

Certification	Posting	Certification	Posting
Certified Information Systems Security Professional (CISSP)	2,262	CompTIA Security+	516
Driver's License	1,002	Cisco Certified Security Professional	437
Certified Information Systems Auditor (CISA)	998	Cisco Certified Network Associate (CCNA)	432
SANS/GIAC Certification	975	Certified in Risk and Information Systems Control	345
IT Infrastructure Library (ITIL) Certification	969	Project Management Professional (PMP)	302

Certification	Posting	Certification	Posting
Security Clearance	935	Cisco Certified Network Professional (CCNP)	291
Certified Information Security Manager (CISM)	887	Certified Salesforce Administrator	249
Project Management Certification	635	GIAC Certified Incident Handler (GCIH)	238
Certified Salesforce Platform Developer	524	American Board for Engineering and Technology (ABET) Accredited	210
Information Systems Certification	520	Cisco Certified Internetwork Expert (CCIE)	209

Source: Burning Glass

Note: 92% of records have been excluded because they do not include a certification. As a result, the chart above may not be representative of the full sample.

Table 11. Education Requirements for Software Development Occupations in Bay Region

Education (minimum advertised)	Latest 12 Mos. Postings	Percent 12 Mos. Postings
High school or vocational training	2,326	3%
Associate's degree	1,052	1%
Bachelor's degree and higher	69,233	96%

Source: Burning Glass

Note: 41% of records have been excluded because they do not include a degree level. As a result, the chart above may not be representative of the full sample.

Methodology

Occupations for this report were identified by use of skills listed in O*Net descriptions and job descriptions in Burning Glass. Labor demand data is sourced from Economic Modeling Specialists International (EMSI) occupation data and Burning Glass job postings data. Educational supply and student outcomes data is retrieved from multiple sources, including CTE Launchboard and CCCCCO Data Mart.

Sources

O*Net Online

Labor Insight/Jobs (Burning Glass)

Economic Modeling Specialists International (EMSI)

CTE LaunchBoard www.calpassplus.org/Launchboard/

Statewide CTE Outcomes Survey

Employment Development Department Unemployment Insurance Dataset

Living Insight Center for Community Economic Development

Chancellor's Office MIS system

Contacts

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